The Truck Driver Shortage and Intermodal Transportation

An Honors Thesis (HONR 499)

by

Madison Turner

Thesis Advisor
Dr. Brad Anderson

Signed

Ball State University
Muncie, Indiana

May 2016

Expected Date of Graduation
May 2016

THE TRUCK DRIVER SHORTAGE AND INTERMODAL TRANSPORTATION

Abstract:

The truck driver shortage has been increasing since the mid 2000's. Unfortunately, the driver shortage is not expected to improve unless solutions are implemented. The truck driver shortage has created a lack of over-the-road truck drivers and made it hard for companies to move goods long distance. Intermodal transportation, or the use of multiple modes of transportation, has been a proposed solution for the current truck driver shortage. This thesis proposes a solution for the shortage, focusing on intermodal transportation and its ability to provide an alternative to long-haul over-the-road trucking.

Acknowledgements:

I would like to thank Dr. Anderson for his willingness to advise me throughout this process. Dr. Anderson has held me to high standards and has made me a better writer and professional throughout this thesis journey. I would also like to thank the ISOM department for giving me a solid foundation in logistics and supply chain management – without this foundation, I would not have found an interest in the truck driver shortage and intermodal transportation. Lastly, the support from the Ball State University Honors College program, my friends, family, and peers has helped me reach my fullest potential here at Ball State. Your support did not go unnoticed and for that, I am grateful.

Table of Contents

Introduction:

The United States truck driver shortage is currently a heavily researched topic. This thesis aims to propose a solution to the truck driver shortage, specifically investigating how intermodal transportation could alleviate the truck driver shortage. Companies rely heavily on truck drivers to get their finished goods or raw materials from point A to point B. However, there is a truck driver shortage in the United States and no clear immediate solution. Current estimates show that there is a deficit of 48,000 and this shortage could grow to almost 239,000 by the year 2022 (Berman, 2015). Studies that have been published outlining this problem have come up with long-term solutions yet the industry has been slow to respond.

Truck driver shortage solutions often center on pay increases, unions, competitive benefit packages, sign-on bonuses, reducing turnover, and other solutions to keep or attract new drivers. Solutions such as sign-on bonuses, while valuable, may only provide temporary solutions with little long-term benefit. Some of the solutions require significant changes for the company, such as wage increases, and it is probable that companies cannot afford some of the solutions presented to decrease the truck driver shortage. There is one proposed solution that could provide a long-term answer to the trucker driver shortage – intermodal transportation. Intermodal transportation is the "the transfer of products involving multiple modes of transportation – truck, railroad or ocean carrier" ("Intermodal Glossary", n.d.).

Intermodal transportation may provide a solution for the truck driver shortage and also offers many extra benefits. However, many companies are slow to adapt to intermodal transportation. Over half of the goods transported in the United States today are transported by over the road trucks ("Intermodal Rail vs Over the Road Trucks", 2015). The United States currently ships more ton-miles via rail than truck – 39.50% and 28.60% respectively. This means

that while rail is being used, it is being used for large, heavy loads and not being used as often as over-the-road trucking. Intermodal transportation, specifically using trucks and railways, can reduce the truck driver shortage while improving transportation infrastructure and help reduce the environmental impact current transportation methods create.

Description of the Truck Driver Shortage:

The truck driver shortage is a result of increasing freight demands and a lack of growth in the pool of truck drivers. The shortage, as previously stated, is estimated at 48,000 truck drivers short and the discrepancy is expected to grow steadily. Figure 1 below from the American Trucking Associations shows that while truck driver numbers are projected to increase steadily over time, the demand for drivers is increasing at a much faster rate. The American Trucking Associations predicted the truck driver shortage in 2005 at a time when the United States was 20,000 drivers short. The economic crisis that occurred around 2008 actually eliminated the truck driver shortage due to the decrease of goods moving across the country. The economic rebound that began to occur in 2011 re-started the driver shortage because demand grew rapidly. Between 2008 and 2011, a time when there was almost no shortage, the total number of drivers did not increase by a significant amount (see Figure 2). This suggests that the decrease in shipping resulted in a period of time when companies were not needing to hire drivers quickly. According to that same chart, the total number of drivers since 2011 has increased. This suggests that companies recognized the need for drivers due to the increase in demand for shipping, yet cannot fulfill that demand due to the shortage. (Costello et. al, 2015)

Figure 1 shows that although the total number of drivers has increased slightly in the United States, the great demand for trucks and type of trucking needed has put a strain on the pool of drivers. According to Bob Costello and Rod Suarez's report for American Trucking Associations,

the need for long distance trucking has increased, yet the turnover rate for TL truck drivers is over 90%. Part of the turnover is actually churning, with drivers switching companies to take advantage of sign on bonuses (Costello et. al, 2015). The turnover rate for less-than truckloads (LTL) companies is 12%. LTL companies allow drivers to be home more regularly and offer more competitive pay. However, LTL companies cannot fulfill the demand for long-distance trucking.

These reports show the need for companies to find a solution that allows truck drivers to drive shorter distances while still satisfying their shipping needs. LTL companies only solve half of that problem. Truck drivers may be able to come home at the end of the night but companies still have a need to ship products long-distances. Intermodal transportation, specifically using trucks to move freight to railways, would allow truck drivers to drive shorter distances and would also assist companies in getting their products shipped further distances with the use of railroads. It's reasonable to say that intermodal transportation could be a solution to the truck driver shortage. The gap that intermodal transportation could fill will be discussed throughout this thesis.

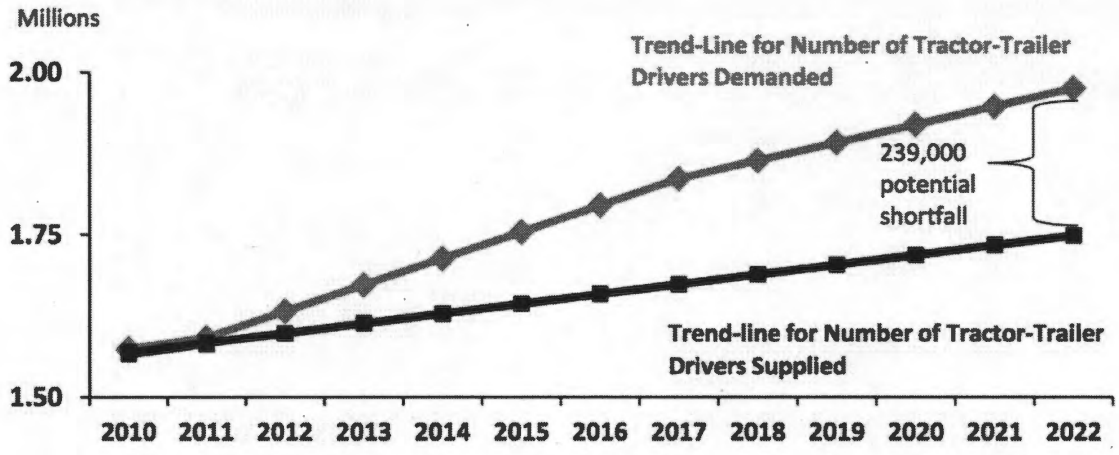

Figure 1 (Badkar, 2014)

Section One: What is Intermodal Transportation?

Understanding how intermodal transportation can help alleviate the truck driver shortage and potentially provide other benefits is reliant on understanding what intermodal transportation is. This section will define intermodal transportation, describe current intermodal transportation in the United States, and discuss the misconceptions that companies have about intermodal transportation.

I: Defining Intermodal Transportation:

According to the IANA, intermodal transportation is "the transfer of products involving multiple modes of transportation – truck, railroad or ocean carrier" ("Intermodal Glossary", n.d.). For the purpose of this analysis, the focus will be on the combined use of trucks and railroad transportation. This is the most common type of intermodal transportation currently used because of the ease of transition between trucks and railroads.

Intermodal containers, containers that can be used between trucks, railways, and sea transport, have multiple names. They may be called ocean containers, cargo containers, freight containers, or container van and can be 20ft or 40ft containers. While 20ft containers are available, 40ft containers are the most common and are the ones primarily used for truck to rail transportation. Semi-trailers, which are fixed to wheels, also have the ability to be transported by rail but are different than the intermodal containers aforementioned, which are not fixed to wheels. For the purpose of this analysis, "containers" is the name that will be used when discussing the different types of intermodal containers. Containers that have the ability to go between trucks and rails are the most common containers on the market, accounting for 89% of containers on the market. Figure 3 from the "World Container Production, 2007" report shows the breakdown

between the types of containers on the market.

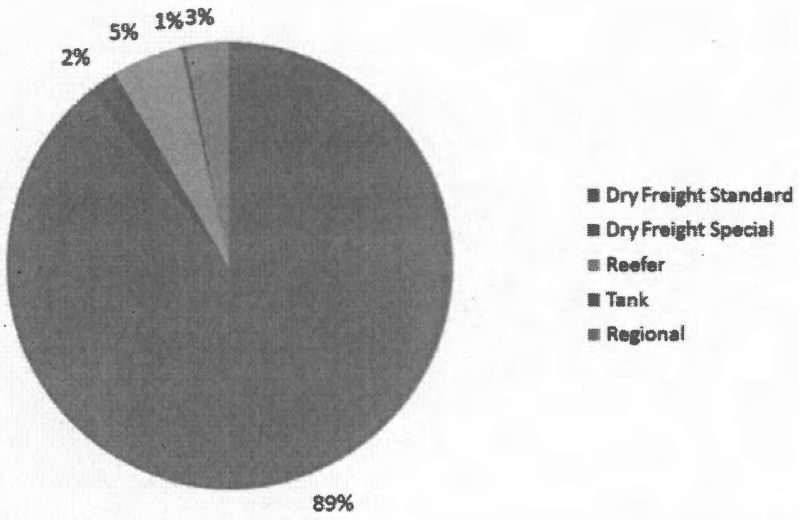

Figure 3 (Rodrigue, 2007)

The chart above shows reefer containers and tanks which can also be transported by rail. However, the ability to move a reefer container or a tank via rail is not always available. For simplicity, this analysis will assume that intermodal transportation refers to containers used between trucks and railways shipping standard goods.

II: Current State of Intermodal Transportation

Intermodal transportation is not the most popular shipping method in the United States. Companies use trucks to get things to airports or seaports but it is not often that companies use railways as a means to bridge the gap between origins and destinations within the United States. Intermodal transportation growth in the United States saw its slowest growing year in 2015. Intermodal transportation grew only 2.2 percent – the slowest year since 2009 (Cassidy, 2015).

The data surrounding how many companies in the United States are currently using intermodal transportation is hard to track. Companies may use a mixture of over-the-road trucking and intermodal, but the breakdown of their specific transportation is not always clear. Instead, the

Association of American Railroads logs the intermodal traffic in tons. This intermodal data shows that in 2014, 120 million tons of goods were shipped using intermodal transportation. That is a ten year high and according to the Association of American Railroads, intermodal transportation is projected to increase the next ten years ("Freight Rail Today", n.d.) Company data may not show how much intermodal transportation the company is using, but the research done by Hutchins indicates that companies that have started using truck to rail to truck transportation (otherwise known as intermodal), rarely switch back to using only trucks for transportation (Hutchins, 2015). This slow growth is partly due to the misconceptions surrounding intermodal transportation. The next section outlines why companies are reluctant to use intermodal transportation.

III: Intermodal Transportation Misconceptions

Companies are reluctant to move to intermodal transportation due to a few misconceptions. As previously mentioned, intermodal transportation has been increasing at a very slow rate. At one point, trains were a slower and unsafe way to ship goods. Despite the potential benefits, companies are hesitant to move goods using intermodal transportation because of their knowledge of the old railroad systems. First, we'll look at the benefits of intermodal transportation according to Jeffrey R. Brashares (2013) of *Inbound Logistics*. The benefits listed below disprove misconceptions that intermodal transportation is expensive, inconsistent, unreliable, and unsecure.

- **Lower and Consistent Costs.** The rates for intermodal transportation are more predictable and can be less expensive than over-the-road trucks. One ton of freight on a train car can move 450 miles with one gallon of gas. Trucks average 4-8 MPG according to Popular Mechanics (Berg, 2012). The higher MPG for trains translates to savings for companies that utilize intermodal transportation. However, there are

times when gas prices are so low that over-the-road trucking may be cheaper than intermodal due to the low gas prices. With gas prices remaining primarily unpredictable, intermodal transportation pricing is more consistent and usually cheaper than over-the-road trucking costs.

- **Consistent Access to Capacity.** Companies may be able to ship product with over-the-road truck drivers but may be paying for an empty truck to come back. Driving an empty truck wastes money and shows an excess in capacity while other companies are struggling to find drivers. Intermodal transportation allows companies struggling to find drivers to put their cargo or empty truck on a train to reduce driver miles.. This does not solve the one-way empty container issue, which wastes money, fuel, and time.
- **Security and Reliability.** There's a fear that intermodal transportation isn't secure or reliable. However, trains are predictable and have a consistent traveling schedule. Also, train cargo can be stacked which makes cargo more secure since it deters thieves from stealing product. A moving train or truck will ensure that goods are safer and with a consistent train schedule and stacked cars, intermodal transportation is safe and reliable.

Many companies have been worried about the price of intermodal transportation in terms of cost and time. It's true that railroads are slower than trucks (Hutchins, 2015). Railroad companies are continually improving their speed to stay competitive with the trucking industry. Over the last year, trains have increased their MPH by .6, an improvement that brings them closer to the speed of a truck. The increase still puts rail transportation approximately two days behind truck transportation (Cassidy, 2015).

Additionally, diesel fuel prices impact a company's decision to switch between truck and intermodal transportation. Lower diesel fuel prices pull companies away from using intermodal transportation. Railways are lowering their rates to stay competitive, keep their market share, and keep prices as consistent as possible (Hutchins, 2015). If fuel prices continue to stay low, it may be cheaper for a company to use an over-the-road truck, as opposed to intermodal transportation. The opposite is true when fuel prices are high.

The truck driver shortage has forced some companies to switch to intermodal transportation. A lack of drivers means that companies must be creative in how they ship goods. According to Cassidy (2015), the companies that have begun to use intermodal transportation have not switched back to using only trucks. With these benefits in mind, the next section discusses more benefits and the future of intermodal transportation.

Section 2: Intermodal Transportation and the Future

The next section will outline the benefits that intermodal transportation can provide and discuss what the future of intermodal transportation will look like. Intermodal transportation

I: The Benefits and Limitations:

Intermodal transportation is beneficial for the truck driver shortage, transportation infrastructure, and the environment.

The Truck Driver Shortage

The solution that intermodal transportation provides for the truck driver shortage has previously been discussed. It is important to re-iterate that companies that have switched to intermodal transportation have done so because of the lack of drivers and it provided the company

a long distance shipping solution (Cassidy, 2015). Intermodal transportation would not directly increase the amount of drivers on the market. Instead, intermodal transportation is a shipping solution that benefits truck drivers and reduces the shortage by alleviating the gap between the supply and demand without hiring several new drivers. It provides a solution for long distance shipping needs, it allows regional truck drivers to continue their routes, and it reduces the demand for over-the-road trucking.

Companies that have begun to use intermodal transportation have not switched back to primarily using over-the-road trucking (Cassidy, 2015). The need to ship products across the country will always be around, but the way it is shipped has the ability to change. Intermodal transportation allows LTL and 3PL companies to still hire regional drivers and allows companies to transport their products across the country – a job that normally went to over-the-road truck drivers.

Infrastructure and Reliability

One of the biggest complaints about rail transportation is that it is slow and perceived as unreliable. These beliefs are not unfounded. As previously mentioned, rail transportation can add up to two more days for shipping. However, rails are increasing their speed and the more companies that move to rail, the more money that can be used to better railroad infrastructure. Hutchins report in the Journal of Commerce (2015) says that railroads increased their speed by .6 MPH in 2014 and 2.2 MPH in 2013. This increase in speed occurred because rail transportation has increased slightly and more money has been available to help better the infrastructure. Speed limits on railways are dependent on the class of rails being used. Better rails equate to a higher speed limit. Most trucks are governed to a maximum speed below 70MPH. Train speeds depend on the class of rails, but on average trains travel between 40-70 MPH ("Freight Rail Today", n.d.).

While trains move slower than trucks on average, they are more reliable than trucks and save companies time when looking for shipping solutions. The more money that is poured into railways, the faster trains can be.

Cargo containers on the road can hold a max of 40,000 lbs. One 40 foot truck on the road is equivalent to 9600 automobiles. This means that the wear and tear on the road is significant. One train car can carry approximately two truckloads which decreases the amount of wear interstates and highways incur. The Department of Transportation allots approximately $24 billion dollars every four years for interstate maintenance, a number that has increased since the 1970's. Of that $24 billion dollars allotted every four years, the average amount spent on interstate maintenance is $100 million dollars per year. The remaining amount is apportioned between state programs intended to better the roads (Weingroff, 2015). The $100 million dollars is used just to maintain the interstate system and US highways. Maintenance can include filling pot holes, repairing crumbling bridges, widening highways, and repaving roads that need it. If a winter is harsher than expected or roads are worse than normal, more money is spent to repair the roads, which leaves less money available for the other programs to better road infrastructure. Intermodal transportation helps take trucks off the road and lessen the damage to the roads in the United States.

Many of the railways in the United States are privately owned which means that infrastructure and maintenance must be privately funded. Between 1980 and 2015, $600 billion dollars have been invested back into the railroads. 40 percent of the revenue from railways goes directly back to the maintenance of the railway. This maintenance includes improvements and upgrades to make the railways safer, faster, and more reliable. Railways are preparing for increased demand and spending more and more to prepare for the projected demand. Figure 4 and 5 below, both from the Association of American Railroads ("Types of Railroads", n.d.), shows the projected

demand for railroads and the current spending on railroads today respectively.

Figure 4 ("Types of Railroads")

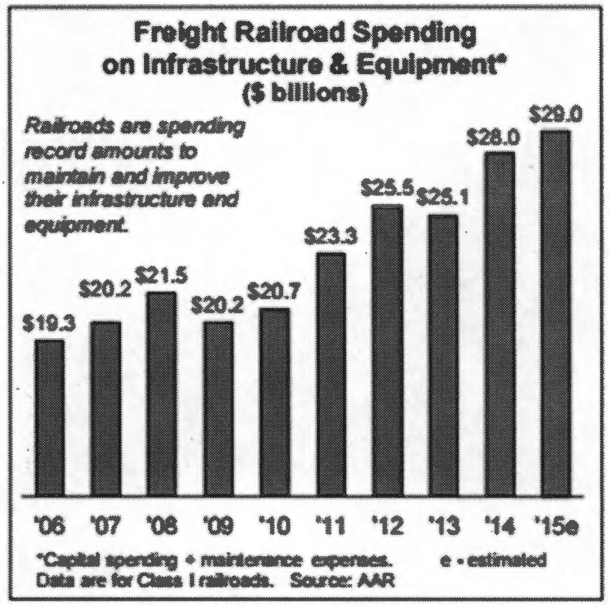

Figure 5 ("Types of Railroads")

The previous two figures indicate that funding and planning for infrastructure for railroads has increased over the last 10 years. Highway infrastructure relies on government help but railway infrastructure is primarily privately funded. Companies should not worry that their shipments would be delayed due to poor infrastructure caused by railways. Rail companies have created better, faster, and more stable railways over the last 10 years and more money is being poured in

to maintain their great quality. Poor highway infrastructure will hurt over-the-road truck driving routes. Poor roads cause delays for drivers who may need to find alternate routes due to damage. The risk for delay increases when there are longer distances involved. Intermodal transportation still relies on some trucking but it does not require long distance hauling so the risk for a shipment to be delayed due to poor highway infrastructure is reduced. Poor highway infrastructure will therefore hurt the companies looking to ship goods via over-the-road trucks.

Environmental Benefit

Intermodal transportation has been touted as the "green" shipping method because of its decreased carbon footprint. Robert Bomba, owner of JEM Transportation, points out that four trucks with 40,000 pounds each creates 17.4 tons of carbon emissions when going the width of the United States. However, those same four containers would only create 7.0 tons of carbon emissions if shipped via rail (Earing, 2009). Even with addition of the trucking carbon emissions to and from the rail station, the impact it has on the environment is significantly less than over-the-road trucking. The decrease in the carbon footprint is primarily due to the higher MPG that trains have and their capacity to move more cargo with less fuel.

One limitation of intermodal transportation is that railroads are not currently accessible in every part of the country. The map below shows the Class I rails in the United States. Class I rails are the railroads that carry 69 percent of freight in the United States. A map of their 141,000 miles of rails is shown below in figure 6 ("Class I Railroads", n.d.) Some Western States do not have many Class I railroads but the shortage of rails is due to geographical barriers (Rocky Mountains, Grand Canyon, etc). The rails that are in place, however, are safe; Class I Railroad companies will not authorize intermodal transportation on any route that may be unsafe or damaged. ("Freight Rail Today", n.d.).

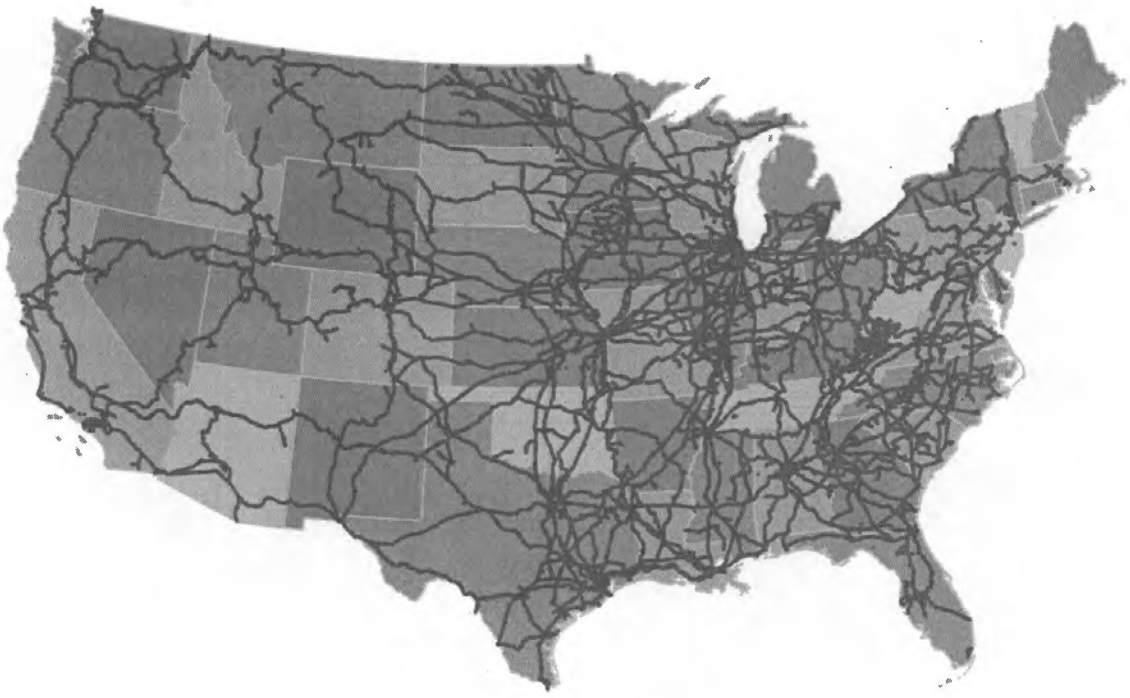

Figure 6 ("Class I Railroads", n.d.)

According to the U.S. Department of Transportation Federal Railroad Administration, the United States is urbanizing – this means that while Class I railroads expand, passenger trains will increase as well. This will create a traffic problem and a limitation for all trains. The good news is that cities and the seven Class I railroad companies have started drafting proposed solutions so that urban America can utilize passenger trains and cargo trains. These solutions have already been put into motion in major cities so while the problem currently exists, it may be eliminated in the future making intermodal transportation more feasible ("Freight Rail Today", n.d.). This potential problem strains a company's ability to predict what they will use for transportation, which could make over-the-road trucking more predictable in the long-term. Below is a table that summarizes some of the pros and cons of both intermodal transportation and over-the-road trucking.

Intermodal Transportation		Over-the-Road Trucking	
Pros	Cons	Pros	Cons
Consistent pricing	Potential for congestion	Faster than intermodal	Bad for environment
Environmentaly friendly	1-2 days slower than OTR	Trucks are safe	Trucks greatly impact highway infrastructure
Intermodal transportation is safe	Still relies on regional truck drivers	Less hassle	Unreliable due to driver shortage

II: The Future of Intermodal Transportation:

Intermodal transportation has come a long way over the last decade. The improving railways and the driver shortage has helped intermodal transportation grow steadily. The number of over-the-road truck drivers is not expected to increase (Morris, 2015). This will hurt companies looking for shipping solutions in the future. Increasing wages for truck drivers is not likely and delaying shipping for over-the-road drivers will no longer be feasible in today's growing economy. The demand to move products across the country, as previously mentioned, is not expected to slow down. Additionally, the current state of the environment has put companies in a situation where they must think about reducing their carbon footprint. Intermodal transportation is more environmentally friendly, which may sway companies to move to intermodal transportation.

However, with the urbanizing of the United States and the unclear picture of what future rails may look like, it may be difficult for companies to consider using intermodal in the long-term. Companies plan shipments and routes in advance in order to forecast spending. If a company relies on a rail system that has great potential to become too congested, the company may play it safe and use over-the-road trucking to ship product as opposed to intermodal transportation. Intermodal is currently being used by companies but not in the capacity it could be. The forecast for future rails may stop a company from considering intermodal as a long-term shipping solution.

More input would be needed from the Class I railways to present plans that would alleviate congestion in the largest cities in the future.

No shipping solution is perfect, but there are significant benefits that intermodal transportation could provide companies. However, more work would need to be done in order for companies to make the switch. Besides showing clear, implementable plans that will combat the future congestion, rail companies must also show that goods could be delivered more quickly. The 1-2 day difference that intermodal transportation has compared to over-the-road trucking could mean the difference between a profit and a loss for a company. The current reliability and consistency that rails show, however, may be more important to a company than timing. If so, intermodal transportation could provide a company more benefits, even if the timing is slower. Slower, reliable shipping may outweigh the perks of having a faster, yet less reliable shipping method. Once the switch is made from over-the-road trucking to intermodal transportation, the truck driver shortage could be alleviated and companies would have a shipping solution that is sustainable and predictable. The current state of the truck driver shortage and the demand companies face indicate that intermodal transportation has the ability to increase and become a more popular means of transporting goods across the United States.

Conclusions:

The purpose of this thesis was to find a solution to the truck driver shortage. Intermodal transportation has been discussed as a solution for the shortage and examined to see if it is a feasible solution for companies. This research, clearly shows that intermodal transportation not only has the ability to reduce the driver shortage, but it also creates better transportation infrastructure due to increased funding, and is likely to remain cheaper than over-the-road trucking. Additionally, the improved environmental impact of intermodal transportation can not be ignored.

This does not mean that intermodal transportation is the best solution for the truck driver shortage. In fact, intermodal transportation does have limitations. The argument could be made that intermodal transportation would take away from the truck driving industry; however, intermodal transportation would just be filling the gap that the truck driver shortage has left behind. The revenue would just be going to LTL, 3PL, or railroads as opposed to paying and waiting for an over-the-road truck driver.

Intermodal transportation, while not perfect, satisfies the shipping needs of companies and decreases the need to find an over-the-road truck driver. Failure to implement solutions to the truck driver shortage will result in increased costs due to the high driving rates and exacerbate the truck driver shortage. The railroads have better infrastructure than ever, their prices are predictable, their safety and reliability has improved, and it is time that companies take advantage of the opportunity to move goods through intermodal transportation. More work needs to be done to improve the limitations of intermodal transportation, but for now moving to intermodal transportation, a proven solution to reduce the truck driver shortage, also provides benefits for the United States and companies in general.

Future Research:

Future research could still be done on what additional railroads should be added. The Class I railroads are owned by seven major companies. The Class I railroads show that there are rail lines in many parts of the country covering most major cities. However, there are some smaller cities that may not have railroads. This would hinder the ability of intermodal transportation. Additionally, Class I railroads are not the only types of rail out there. There are other types of rail lines that were not mentioned because they cannot carry all types of freight that Class I rail lines can. Studying additional types of rail would be interesting because it could show the full capacity

of intermodal transportation, and it could also eliminate some limitations previously mentioned.

Railroads require specialized workers and engineers to maintain existing lines and build new lines. The specialization that is required may cause problems for the future. More information would be needed to understand the capacity of rail lines if demand were to increase suddenly. It would also be interesting to study the transfer of worker requirements needed by the train industry, versus the loss to the trucking industry. Train engineers are often gone for long periods of time, a problem that has pushed many drivers away from over-the-road trucking. If workers are unwilling to be gone for long periods of time, would there be a train engineer shortage in the future? It may not be likely because one train engineer could carry hundreds of containers. Attracting new train engineers to the industry, however, could also be an issue. This data could be beneficial if intermodal transportation increases as predicted over time.

Summative Comments:

I used this thesis as an opportunity to do more research on the truck driver shortage. My interest in the truck driver shortage sparked during my summer internship in 2015 and was brought up again when I began applying for jobs. I wanted to be aware of current trends and problems within my field and the truck driver shortage is something that impacted every job I applied for.

A fellow Ball State Honors College Peer previously did his thesis on the truck driver shortage. One solution he discussed was intermodal transportation. I knew very little about intermodal transportation prior to beginning my thesis but after doing research, it became clear that this topic was what I wanted to learn more about. I am thankful for the opportunity to create a thesis that I became more interested in the further I got into my research.

My internship experience was in quality and supply chain. This thesis taught me much more about logistics and helped round out my Logistics and Supply Chain Management degree. I believe that this thesis, plus my work and classroom experience, has prepared me for whatever the work place might throw my way. This thesis has also taught me that it's important to stay current with the latest research, trends, and data surrounding my field. I am grateful for the opportunity to have grown as a student and professional during my last semester of my undergraduate career.

Reference List

Badkar, M. (2014, August 4). *There's A Huge Shortage Of Truck Drivers In America - Here's Why The Problem Is Only Getting Worse*. Retrieved February 11, 2016, from http://www.businessinsider.com/americas-truck-driver-shortage-2014-7

Berg, P. (2012, August) *10 Things You Didn't Know About Semi Trucks* Retrieved March 24, 2016, from http://www.popularmechanics.com/cars/trucks/g116/10-things-you-didnt-know-about-semi-trucks/

Brashares, J. (2013, July). *Intermodal Transportation's Strategic Advantage.* Retrieved March 24, 2016, from http://www.inboundlogistics.com/cms/article/intermodal-transportations-strategic-advantage/

Cassidy, W. (2015, September). *US Shippers Struggling with Converting Truck Loads to Intermodal.* Retrieved February 12, 2016, from http://www.joc.com/rail-intermodal/class-i-railroads/us-shippers-struggling-converting-truck-loads-intermodal_20150917.html

Class I Railroads. (n.d.) Retrieved March 28, 2016, from http://archive.freightrailworks.org/network/

Costello, B., Suarez, R. (2015) *Truck Driver Shortage Analysis 2015* Retrieved February 10, 2016, from http://www.trucking.org/ATA%20Docs/News%20and%20Information/Reports%20Trends%20and%20Statistics/10%206%2015%20ATAs%20Driver%20Shortage%20Report%202015.pdf

Rodrigue, Dr. J. (2013, July) *World Container Production, 2007* Retrieved February 11, 2016.

Douglas, M. (2013, October) *Intermodal Efficiencies*. Retrieved March 24, 2016, from http://www.inboundlogistics.com/cms/article/intermodal-efficiencies/

Earing, A. (2009, February) *Intermodal Transportation: A Green Way to Ship.* Retrieved April 24, 2016, from http://www.manufacturing.net/article/2009/02/intermodal-transportation-green-way-ship

Freight Rail Today (n.d.) Retrieved March 24, 2016, from https://www.fra.dot.gov/Page/P0362

Hutchins, R. (2015, August) *US Domestic Intermodal Shippers Moving Loads Back to Trucks.* Retrieved February 12, 2016 from http://www.joc.com/rail-intermodal/class-i-railroads/us-domestic-intermodal-shippers-moving-loads-back-trucks_20150803.html

Intermodal Glossary. (n.d.) Retrieved February 13, 2016, from http://www.intermodal.org/information/glossary.php

Intermodal Rail vs Over the Road Trucks. (2015, April) Retrieved February, 11, 2016, from https://www.freight-specialist.com/intermodal-rail-vs-over-the-road-trucks/

Morris, F. (2015, December) *Trucking Shortage: Drivers Aren't Always In It For The Long Haul.* Retrieved March 24, 2016, from http://www.npr.org/2015/12/14/459348786/trucking-shortage-drivers-aren-t-always-in-it-for-the-long-haul

Types of Railroads. (n.d.) Retrieved March 28, 2016, from https://www.aar.org/todays-railroads/our-network?t=typesofrailroads

Weingroff, R. (2015, November) *Highway History*. Retrieved April 1, 2016, from https://www.fhwa.dot.gov/infrastructure/intmaint.cfm